Remarks

In the non-final Office Action mailed on September 18, 2006, the Examiner rejected claims 1-6, 8, 11-15 and 17-20 under 35 U.S.C. 102(b) as anticipated by Bingham (U.S. Patent 6,954,712). The Examiner objected to claims 7, 9, 10, 16, 21 and 22 as being dependent upon a rejected base claim, but stated the claims would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

Applicants respectfully traverse the Examiner's objection and rejection, and request reconsideration and withdrawal of same. Applicants have amended claims 1, 11 and 17 to clarify that the first and second SAS components are in situ (i.e., in their normal operating environment), as recited in the preamble of claims 1 and 17. Applicants have further amended claims 1 and 17 to clarify that the stimulus is generated within the first SAS component, and that the stimulus represents an anomalous condition in the SAS domain. Applicants have amended claim 7 to correct a typographical error (inserting a comma).

35 U.S.C. §102 Rejection

The Examiner rejected claims 1-6, 8, 11-15 and 17-20 under 35 U.S.C. 102(b) as anticipated by Bingham. The rejection will be discussed in regard to independent claim 1.

Claim 1 is directed at a method for testing a SAS component in situ in a SAS domain. The method allows one SAS component (i.e., a SAS expander) to test another SAS component (i.e., a SAS device) within the normal operating environment of the SAS components. The first SAS component generates a stimulus representing an anomalous condition. The stimulus is applied to a second SAS component coupled to the first SAS component. The first and second SAS components are in situ (i.e., operable within the functioning SAS domain). The first SAS component receives a response from the second SAS component. The first SAS component is able to test the second SAS component within the SAS domain. Thus, no external testing device is needed to test a SAS component. Further, SAS components do not need to be removed from their normal operating environment (i.e., the SAS domain) to be tested. This limitation is important in

that, as noted in the Background, it is a problem to test devices outside their normal operating environment. Signal timing and other environmental issues changed by removing the device from its normal operating environment can change the response of the device to a test stimulus and thus change the ability to detect and correct error conditions or other anomalous behavior.

The Examiner states that Bingham teaches the method of claim 1. Applicants assert that Bingham does not teach or reasonably suggest the method of claim 1. First, the method of claim 1 is directed at testing a SAS component (i.e., a device within a serial attached SCSI domain) in situ in a SAS domain. The Bingham reference teaches a system and method for testing parallel SCSI devices. While the reference and the present application generally involve SCSI devices, there are significant differences between the bus structure and topology of parallel SCSI systems and serial attached SCSI (SAS) systems. These differences mean that parallel and serially attached SCSI systems should be tested in different ways. Significant differences between the desired testing methodologies will become apparent in the discussion below.

The Bingham reference does not teach testing devices in situ. Amended claim 1 allows for a SAS component to be tested without disconnecting or isolating the SAS component from the SAS domain or other SAS components (i.e., expanders or other SAS devices). A SAS component may therefore be tested within its normal operating environment, i.e., while dependent on other devices within the SAS domain and subject to all other environmental conditions of the SAS domain in normal operation.

By contrast, the method disclosed by Bingham tests devices independent of other SCSI devices attached to the bus (Bingham col. 5, lines 5-8). The tester 204 of Bingham is connected to an external SCSI port of the SCSI device being tested (e.g., tape drive 112 - Bingham col. 9, lines 18-21). Thus, the device is physically isolated from the other devices on the parallel SCSI bus. Alternatively, a device may be selected for testing and all the other SCSI devices on the SCSI bus 108 may be turned off so that logical diagnostic tests conducted by the tester 204 can be conducted on a single SCSI device (Bingham col. 13, lines 31-34). Thus, the system and method described by Bingham does not teach testing a device in situ. Rather, Bingham teaches the opposite, testing a

device isolated from its normal operating environment to determine if problems are caused by a single SCSI device.

A SCSI device connected to a parallel bus structure as in Bingham is not easily tested independent of other devices connected to the parallel bus. Thus, parallel bus structures typically require each device to be physically disconnected from the bus, or physically or logically isolated from other devices, such as by powering off other devices on the bus (as disclosed by Bingham). This is a drawback to parallel bus structures, because it is difficult to ascertain problems without isolating a SCSI device from other SCSI devices. On the other hand, the present application teaches testing a serial attached SCSI (SAS) domain in situ. The present application allows for testing of a SAS component dependent on the other SAS components of the SAS domain, whereas Bingham would not. Applicants have amended claim 1 to clarify that the first SAS component and the second SAS component are operating in situ, as the preamble recites a method for testing a SAS component in situ in a SAS domain. Thus, Applicants submit that Bingham and the present application solve different problems encountered with different types of bus structures with different testing methodologies.

Additionally, Bingham does not disclose or reasonably suggest generating a stimulus representing an anomalous condition. Anomalous conditions may include any of several exception and error conditions not frequently encountered in normal operation of a SAS domain. The Examiner states that generating a stimulus representing an anomalous condition is taught in Bingham at col. 5, lines 55-57. However, the cited passage of Bingham states "The logic device is also programmed to conduct a diagnostic test on the peripheral device." The cited passage does not mention an anomalous condition. The paragraph of Bingham further states "In one embodiment, the diagnostic test is a logical diagnostic test. In another embodiment, the diagnostic test is a host scan." (Bingham col. 5, lines 55-59).

Logical diagnostic tests and host scans are not anomalous conditions. Rather, these are standard commands understood by all SCSI devices. Bingham states "The logical command is one example of a logical diagnostic test. In a preferred embodiment, the tester 204 issues an inquiry command." (Bingham col. 15, 32-34). As described by Bingham, "an inquiry command is a universal SCSI command understood by all SCSI

devices" (Bingham col. 15, 35-36). Bingham is testing the devices to make sure that a device is connected and configured correctly, and to ascertain certain information regarding the device, such as the SCSI ID. Bingham does not test a device by generating anomalous conditions applied as stimuli to the device to be tested. Thus, Applicants maintain that Bingham does not teach generating a stimulus representing an anomalous condition.

For the reasons stated above, Applicants submit that claim 1 is novel and unobvious over all art of record, considered individually, or in any combination. Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1. These same arguments apply to independent claims 11 and 17, as well as dependent claims 2-6, 8, 12-15 and 18-20. Additionally, dependent claims 2-6, 8, 12-15 and 18-20 recite additional limitations not found in the prior art. Applicants therefore respectfully request reconsideration and withdrawal of the 102 rejection.

Objection to Claims

The Examiner objected to claims 7, 9, 10, 16, 21 and 22 as being dependent upon a rejected base claim, but stated the claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants assert that amended independent claims 1, 11 and 17 are novel and unobvious over all art of record, considered individually or in any combination, for at least the reasons stated above. Thus, Applicants maintain that claims 7, 9, 10, 16, 21 and 22 are allowable at least as dependent from an allowable base claim. Applicants respectfully request reconsideration and withdrawal of the objection of claims 7, 9, 10, 16, 21 and 22.

Conclusion

     Claims 1, 7, 11 and 17 have been amended for editorial clarity and to better protect the invention. Claim 7 has been amended to correct a typographic error (a missing comma). Applicants have thoroughly discussed the objection and the rejection of the claims and respectfully request reconsideration and withdrawal of the outstanding rejection and objection.

     No additional fees are believed due. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney.

Respectfully submitted,

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